



## DESIGNED GROUT MIXES AND TESTING

Grout Matt, once prepared, is grout injected under high pressure of up to 1.0MPa on site to provide the desired end result.

The basic mix designs commonly used are:-

1. 500 kg cement  
1100 kg coarse sand (wadi sand)  
700 kg fine sand (dune sand)  
460 litres fresh water
2. 380 kg cement  
120 kg pozzolanic fly ash  
1100 kg coarse sand (wadi sand)  
700 kg fine sand (dune sand)  
460 litres fresh water

These two examples of designed grout mix can vary with the quality or availability of sands. For example, if a river sand is used which has a high content of fines then the mix could be:-

500 kg cement  
1400 kg coarse sand  
400 kg fine sand  
460 litres fresh water

Compressive strengths resulting from the above mix designs can vary due to the quality of the sands available in a particular area which is why a minimum of 20 MPa is recommended for specifications.

Testing for compressive strength using the above mix design:-

1. Stitch up a 1 metre by 1 metre sample of fabric. Inflate test sample of GROUT MATT and pressurise, this will reduce the water cement ratio from approximately 0.9 to 0.6, therefore making the mix suitable for either standard cubes or cylinders.
2. Cut away the fabric, remove the remaining grout and place into a bucket to hand mix, a small amount of water may in some circumstances have to be added.

3. Then, once mixed up to a suitable consistency, place the mix into either standard cubes or cylinders in 3 layers of approximately equal volume. Each layer is tamped a minimum of 25 times and no more than 40 times.
4. The field specimens should then be stored undisturbed in their moulds, with cover plates fitted for approximately 18 to 72 hours at a storage temperature between 13°C and 33°C. The cylinder should be carefully stripped after 48 hours and the side of the cylinder marked with waterproof paint or crayon to show the date of casting and reference number. The concrete cylinder should then be immediately placed into a water bath where the temperature is maintained at 23° +/- 2°C.

## NOTE:

With point No. 2 it is necessary to sometimes hand mix the grout due to the fact that when it is pumped into the fabric under pressure a crust is formed which is drier than the centre.

Hand mixing ensures that the grout is of a uniform consistency prior to placing into cylinders or cubes.

The water/cement ratio for the designed grout mixes is 0.9, this is extremely wet and is necessary as the water is the transporting agent for the sand and cement mix into the grout matt.

Once the mattress has been inflated and starts to pressurise then the excessive water is squeezed out of the mix and the fabric. Consequently, the final result is a water cement ratio of approximately 0.6.

## ADMIXTURES

In certain circumstances, especially if the quality of sands is difficult to work with, the use of super plasticisers can be used - up to 5 kg per 500 kg of cement.

Apart from greatly improving the workability characteristics of the mix, super plasticisers usually offer higher strengths.

The actual type or brand of super plasticisers would have to be determined from that available at the local batching plant.